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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,957	06/24/2003	Jung Ho Ma	CU-3270 RJS	1220
26530	7590	09/22/2004	EXAMINER	
LADAS & PARRY LLP 224 SOUTH MICHIGAN AVENUE SUITE 1200 CHICAGO, IL 60604			SCHECHTER, ANDREW M	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/602,957	MA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Andrew Schechter	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5 and 7-10 is/are rejected.
- 7) ☒ Claim(s) 3,4 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. Figures 4A and 4B should be designated by a legend such as --Prior Art— because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Objections***

3. Claim 1 is objected to because of the following informalities: “upper electrode” in line 16 should be “upper substrate”. Appropriate correction is required.

4. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims

are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 7 and 8 (the second occurrence of these numbers) have been renumbered 9 and 10.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim et al.*, U.S. Patent No. 6,567,144, in view of *Kataoka et al.*, "39.4: A New MVA-LCD with Jagged Shaped Pixel Electrodes", SID Digest 2001, pp. 1066-1069 in view of *Hatano et al.*, U.S. Patent No. 5,805,250.

*Kim* discloses [see Fig. 7, for instance] a vertical alignment mode LCD which comprises upper and lower substrates and liquid crystal with negative dielectric anisotropy [col. 4, line 11, for instance], a counter electrode [10] which is formed on the inner surface of the upper substrate, vertical alignment films [15, 25] as recited, and crossed polarizers [16, 26] as recited.

*Kim* does not disclose a jagged pixel electrode. *Kataoka* discloses [see Fig. 4] a jagged pixel electrode and teaches its use in an analogous LCD. It would have been obvious to one of ordinary skill in the art at the time of the invention to use such a

jagged pixel electrode in the device of *Kim*, motivated by *Kataoka*'s teaching that these jagged pixel electrodes provide fast gray-scale response characteristics while keeping other advantageous characteristics the same [see abstract].

*Kim* and *Kataoka* do not disclose an insulating film formed on the inner surface of the lower substrate, having a hole formed therein, with the pixel electrode covering more than half the hole. *Hatano* discloses [see Figs. 1 and 2] such an insulating film [48] having a hole [contact hole 36] formed therein, with the pixel electrode covering more than half the hole. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the insulating layer and contact hole of *Hatano* in the above device, motivated by *Hatano*'s teaching that doing so allows the pixel electrode to overlap the scanning and signal lines, thereby improving the aperture ratio among other advantages [col. 16, lines 40-67]. Claim 1 is therefore unpatentable.

*Hatano*'s contact hole is rectangular, so claim 2 is also unpatentable. *Kim* discloses phase compensation plates [41, 42] as recited, so claim 7 is also unpatentable.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim*, *Hataoka*, and *Hatano* as applied to claim 1 above, and further in view of *Shimada et al.*, U.S. Patent No. 6,147,722 and *Yasukawa*, U.S. Patent No. 6,344,888.

The interval between adjacent pixels being less than 10  $\mu\text{m}$  does not appear to be explicitly disclosed. *Shimada* discloses analogous pixel electrodes which are "typically 5  $\mu\text{m}$ " apart [col. 16, lines 24-27] and *Yasukawa* discloses analogous pixel electrodes which are "in close proximity to the adjacent pixel electrode... for example, 1

μm, so as to decrease the light leaked between the pixel electrodes as much as possible" [col. 10, lines 40-44]. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to make the interval less than 10 μm, motivated by the above teaching of *Yasukawa*. Claim 5 is therefore unpatentable.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim*, *Kataoka*, and *Hatano* as applied to claim 7 above, and further in view of *Terashita et al.*, U.S. Patent No. 6,512,561.

*Kim* discloses using monoaxial or biaxial phase compensation plates [col. 7, lines 2-13], but is silent on the phase delay value in either case. *Terashita* discloses [col. 12, lines 20-52] using two monoaxial (uniaxial) phase compensation plates in an analogous LCD and having the phase delay value set to 175 nm, within the recited range. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the above device, motivated by *Terashita's* teaching that optimizing the phase delay value in this way reduces light leakage in an inclined direction and produces a better display. Claim 8 is therefore unpatentable.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim*, *Kataoka*, and *Hatano* as applied to claim 1 above, and further in view of *Arakawa et al.*, U.S. Patent No. 6,621,550.

The above references appear to be silent on the value of the dielectric anisotropy. *Arakawa* discloses, for an analogous vertically aligned LCD, having the dielectric anisotropy range from -2 to -10. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the device of *Sasaki*,

Art Unit: 2871

motivated by *Arakawa's* teaching that if the value is closer to zero than  $-2$ , the threshold voltage required to drive the device increases undesirably, and that there are no practical liquid crystals having a value greater than  $-10$  [col.2, lines 27-59]. Claim 9 is therefore unpatentable.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim*, *Kataoka*, and *Hatano* as applied to claim 1 above, and further in view of *Yamada et al.*, U.S. Patent No. 6,466,296.

The above references appear to be silent on the value of the thickness and refractive index anisotropy. *Yamada* discloses, for an analogous vertically aligned LCD, having the liquid crystal thickness about  $6\text{ }\mu\text{m}$  and the refractive index anisotropy 0.08, so that the product is 480 nm, within the range recited. It would have been obvious to one of ordinary skill in the art at the time of the invention to use these values in the above device, motivated by *Yamada's* teaching that doing so obtains a retardation giving a satisfactory contrast [col. 8, lines 21-25]. Claim 10 is therefore unpatentable.

#### ***Allowable Subject Matter***

11. Claims 3, 4, and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device of claim 3, in particular the additional limitation that the hole has a height less than 2  $\mu\text{m}$ , a length of a shorter side less than 5  $\mu\text{m}$ , and a wall angle of 10-90°. Claim 3 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 4, in particular the additional limitation that the ratio of the portion of the hole covered to the portion uncovered is between 1:1 and 5:1. Claim 4 would therefore be allowable if rewritten appropriately.

The prior art does not disclose the device of claim 6, in particular the additional limitation that the hole is positioned at both a concave portion and a convex portion of the jagged pixel electrode. Claim 6 would therefore be allowable if rewritten appropriately.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2871

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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17 September 2004